Accelerating action | Investing for impact

First International Conference
Global Framework on Chemicals

16–20 November 2026 | Geneva, Switzerland

Implementation Programme

"Industry Engagement and Action along Value Chains"

Workstream on Private Sector Financing and Investment

Briefing Note: Hazardous chemicals

Why they matter to financial institutions

Convenor(s): ***UNEP Finance Initiative*** *– Peggy Lefort, Benjamin Warr, Aditi Srivastava, peggy.lefort@un.org, benjamin.warr@un.org, aditi.srivastava@un.org*

About this document: *This briefing note has been developed under the Private Sector Financing and Investment Workstream of the Global Framework on Chemicals (GFC) Implementation Programme. It provides an introduction to hazardous chemicals and their relevance to financial institutions, outlining how chemicals-related impacts on human health and the environment can translate into financial risks across lending, investment and insurance portfolios. It examines the evolving regulatory and policy landscape, key financial risk transmission channels, and challenges associated with identifying and assessing chemicals-related risks. The briefing note also presents practical approaches and emerging financial-sector practices for strengthening risk assessment, due diligence, client and investee engagement, and portfolio management. It is intended to support financial institutions in better understanding and managing hazardous chemicals-related risks while identifying opportunities to finance the transition towards safer and more sustainable chemicals management.*

Contents

Contents 2
Positioning statement 3
Acknowledgements 3
Executive Summary 5
A. What makes a chemical hazardous 7

The 'known unknowns' problem 11
Hazardous chemicals in the international policy landscape: GFC's focus 12

B. Why are hazardous chemicals important to manage and monitor 14

Chemicals across the value chain: where hazards emerge 14
Double materiality and transmission channels 15
Regulatory tightening 16
Litigation as a leading indicator 18
Market and reputational risks 19
The data gap: why is chemical risk hard to see? 21

C. How financial institutions can respond 22

Impact mapping 22
Build internal capabilities 23
Supporting client or investee company transition 24
Managing portfolio exposure 25
Proactive stakeholder engagement as a risk management tool 26
Emerging practices: what leading financial institutions are doing 26

References 29

Positioning statement

This report has benefited from collaborative, multi-stakeholder input. The views expressed in this publication are those of the authors and do not necessarily reflect the views of contributing or convening organisations. Particularly, case studies included within the publication reflect the views of their contributors, and their inclusion should not imply endorsement or directed, collective action. Where current practices and relevant barriers are reported, this content does not aim to be prescriptive as to actions or decisions to be taken by individual financial organisations.

Acknowledgements

This report has been produced collaboratively with members of the Private Sector Financing and Investment Workstream of the Global Framework on Chemicals (GFC) Implementation Programme. It was collated by UNEP FI (Peggy Lefort, Aditi Srivastava, Benjamin Warr) and the co-leads of Track 1 of the Workstream, Rakesh Vazirani (Bureau Veritas) and Tsitsi Griffiths (Federated Hermes), with the support of co-leads of the overall Workstream, Rachel Crossley (BNP Paribas Asset Management), Anna Chilton (ING), Rory Sullivan and Tanya Cox (Chronos Sustainability), and Ismahane Remonnay (Veolia). We wish to acknowledge the active participation of, and contributions made by other Workstream tracks co-leads Harry Mansfield, Kayleigh Lee-Simion and Nathan Cole (CDP), and Alexandra McPherson (Clean Production Action).

We also wish to acknowledge contributors from the Private Sector Financing and Investment Workstream who contributed to the development of this briefing note through workstream discussions, input, review and work, as well as reviewers (*alphabetical order of organisation*):

Arthur van Mansvelt (Achmea), Kontodimou Zoi (Alpha Bank), Tatjana Vetter and Christine Elisabeth Schneider (BASF), Francesca Pellegrino and Thibaud Escalon (Banco Bilbao Vizcaya Argentaria - BBVA), Franco Alexander Piza Rondon (Bancolombia), Andreas Taliotis (Bank of Cyprus), Robert-Alexandre Poujade (BNP Paribas Asset Management), Jayen Veerapen (Bank of Montreal - BMO), Mark Rossi (Chemical Footprint Project), Patrik Witkowsky (ChemSec), Farah Sadek (Commercial International Bank - CIB), Komal Sharma and Vijaypal Singh Bains (Emirates NBD), Shershneva Varvara and Alexander Osojnik (Erste Asset Management), Maria Ruiz-Cuevas and Carlos Bravo Navarro (European Chemical Industry Council - Cefic), Bernhard Frey and Olena Liakh (European Financial Reporting Advisory Group - EFRAG), Takashi Nishida and Taishi Kawamura (EX Research Institute Ltd. - EXRI), Mario Yarto

(Food and Agriculture Organisation), Jasmine Khatri and Peter Elwin (Finance for Biodiversity Foundation), Alia Meftah (First Abu Dhabi Bank), Baleseng Leeu (FirstRand), Raleigh Davis and Chrysanthi Sofokleous (ICCA), Thamar Zijlstra (Global Reporting Initiative - GRI), Benoit Cheron (IFRS Foundation), Dun, J.P. van (ING), Kohjiro Hashizume (Japan Chemical Industry Association - JCIA), Amisa Kadzo Mwathethe and Judith Sidi Odhiambo (Kenya Commercial Bank - KCB), Emiko Hase (Kao Corporation), Larisa Ruoff (Loring, Wolcott & Coolidge), Caroline Boden (Mercy Investment Services), Chikako Shindo, Koki Takaki, Yuka Uchida, Mitsugu Saito and Ruka Kohara (Ministry of the Environment, Japan - MOEJ), Eeva Leinala and Robert Youngman (Organisation for Economic Co-operation and Development – OECD), Juan Salazar (Pictet Group), Richard Wielechowski and Thalia Bofiliou (Planet Tracker), Sophie Angel (Rathbones Group), Yan Dong, Ph.D. and Zhaoxin Wang (Research Institute for Environmental Innovation (Suzhou), Tsinghua), Eve Gleeson and Veronika Starell (ShareAction), Laure Bourgoin and Khadija Khan (Société Générale), Lyle Bryant, Masaya Shirotani and Toyomi Takeda (Sumitomo Mitsui Banking Corporation - SMBC), Alice Merry (Three Fin Consulting), Kate Monahan (Trillium Asset Management), Joel Tickner (UMAss Lowell, Change Chemistry), Achim Alexander Halpaap, Eduardo Caldera Petit, Laila Petrie, Markos Ieridis and Sandra Averous-Monnery (UNEP), Kavita Sachwani (UNEP FI), Oliver Wootton (UNITAR), Piergiuseppe Morone (Unitelma Sapienza, University of Rome), Christian Kaufholz, Madeleine Sophia Brandes and Tasnima Zaman (World Economic Forum - WEF), and Tomoo Machiba (Zeroboard Research Institute).

Note: The present note has not been formally edited or designed.

Executive Summary

1. Hazardous chemicals are a growing source of financial risk. Depending on exposure, they can have significant, well-documented negative impacts on human health, ecosystems and economic activity, while the universe of substances considered hazardous continues to evolve as scientific understanding advances. For financial institutions, the challenge extends beyond currently regulated chemicals to those that may later be identified as harmful, creating a persistent "known unknowns" challenge. This challenge is compounded by the scale of chemical production - 95% of all manufactured goods rely on some form of industrial chemicals (ChemSec, 2024a), the increasing complexity of global value chains, and limited transparency on where hazardous substances are produced, used, released and accumulated. As a result, chemicals-related risks often remain largely invisible within conventional lending, investment and insurance risk frameworks. While significant financial losses linked to hazardous chemicals have so far been concentrated in a limited number of high-profile cases, and are often viewed by investors as company-specific rather than systemic risks, the widespread use of chemicals across sectors and value chains points to the potential for broader financial exposure. At the same time, integrating chemicals considerations into financing and investment decisions can help financial institutions direct capital towards safer, more resilient business models and identify emerging transition-finance opportunities.

2. Pollution degrades the ecosystem services that underpin all economic activity: an estimated US$44 trillion of economic value generation, over half of global GDP, is moderately or highly dependent on nature and its services (World Economic Forum, 2020). For banks specifically, roughly 75% of euro-area bank loans are extended to firms highly dependent on at least one ecosystem service (European Central Bank, 2023). Pollution is one of the drivers eroding those services, and the cost of their continued degradation is estimated at least US$479 billion a year (UNEP FI, 2020). Human health impacts are equally significant. WHO estimates that in 2016 around 13.7 million deaths in the world – 24% of all fatalities – were linked to modifiable environmental factors, including chemicals, waste and pollution (WHO, 2025). Globally, 2 million lives and 53 million disability-adjusted life years (DALYs) were lost in 2019 due to exposure to selected chemicals (WHO, 2023).

3. Chemical pollution creates financial risk through multiple reinforcing transmission channels. Physical risks arise as pollution degrades ecosystem services, undermines productivity, damages natural capital and imposes wider economic costs through adverse human health outcomes. Transition risks emerge through tightening regulation, litigation,

technological change, market expectations and shifting consumer preferences. Litigation increasingly acts as an early warning signal, demonstrating that financial exposure can materialise well before regulatory frameworks or scientific consensus are fully established. Together, these dynamics can affect borrower creditworthiness, collateral values, insurance losses, operational resilience and long-term portfolio performance.

4. Hazardous chemicals are governed through an evolving international architecture of conventions, standards and voluntary initiatives, within which the Global Framework on Chemicals (GFC) provides the overarching framework for chemicals and waste. The GFC strengthens links between chemicals management, biodiversity, climate, human health and sustainable development while establishing clear expectations for greater private sector action, improved disclosure, stronger chemicals management and increased mobilisation of finance. This briefing is intended as a practical introduction for financial institutions.

5. This briefing note starts by providing a practical introduction to hazardous chemicals and why they matter for financial institutions. It explains what makes a chemical hazardous, distinguishes hazard from risk, outlines how hazardous chemicals are identified across different international frameworks and jurisdictions, and introduces the evolving nature of chemical risk. It also situates the GFC within the broader international policy landscape, highlighting its links with biodiversity, climate, human health and sustainable development.

6. It then examines how hazardous chemicals create financially material risks for banks, insurers and investors. It explores how environmental and health impacts translate into physical and transition risks through regulatory tightening, litigation, market and reputational pressures, and the degradation of ecosystem services. It also considers how these transmission channels reinforce one another, why chemicals-related risks are often difficult to identify due to significant data and disclosure gaps, and why hazardous chemicals should be considered a cross-sector portfolio issue rather than a niche environmental concern.

7. Finally, it outlines practical actions financial institutions can take to strengthen the management of hazardous chemical risks across lending, investment and insurance portfolios. It presents approaches for identifying priority sectors and portfolio hotspots, building internal capabilities, strengthening due diligence and client or investee engagement, managing portfolio exposure, and collaborating with stakeholders. The section also highlights emerging tools, frameworks and case studies that illustrate how leading financial institutions are beginning to integrate chemicals and waste considerations into risk management, decision-making and transition strategies.

8. This briefing connects to the GFC implementation programme's other cross-cutting workstreams, including those on Identification of Priority Chemicals of Concern, Chemical Footprint Approaches, Transparency, Traceability and Disclosure along value chains, and Reporting Standards and Frameworks whose outputs can inform and shape the priority substances, metrics, and disclosure standards available to financial institutions. It is the first of a two-part series of briefing notes, the second being on the topic of Safer Alternatives (GFC, 2026b).

A. What makes a chemical hazardous

9. Hazardous chemicals are a diverse range of substances capable of causing acute or chronic harm to human health, posing severe physical risks such as fires or explosions, and inflicting long-term damage on ecosystems if improperly managed. Managing hazardous chemicals is, above all, an identification and targeting problem: the priority is to identify and act on the substances that carry most of the harm.

10. **A definition, not a fixed list:** The definition of hazardous chemicals is not static; it is a dynamic designation shaped by evolving scientific evidence, regulatory developments, and international agreements. In regulatory and occupational-health use, the term describes substances whose intrinsic properties can harm human health or the environment. The Global Framework on Chemicals (GFC) adopts a definition-by-reference approach, anchoring the term to established international agreements and systems such as the Basel, Rotterdam and Stockholm (BRS) Conventions (UNITAR, n.d.), for waste, trade and persistent pollutants; the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) for hazard classification (UNECE, 2025); and the Food and Agriculture Organization (FAO)/World Health Organisation (WHO) criteria for Highly Hazardous Pesticides (HHPs) (FAO, n.d.).

11. **Hazard is not the same as risk:** Hazard is a property of the substance itself, not of any particular pollution event. Risk is a function of both the intrinsic hazard of a substance and the exposure to it: Risk = f (Hazard, Exposure, Vulnerability) (IPCC, 2012). Hazard refers to the intrinsic properties of a chemical, for example toxicity, persistence, and bioaccumulation, while exposure reflects the extent, concentration, duration, and frequency of contact. Vulnerability captures the differing susceptibility of people and ecosystems to harm from the same level of exposure. A substance with hazardous properties may present limited risk under controlled conditions and significant risk where exposure is widespread, frequent, prolonged, or poorly managed in the presence of vulnerable organisms.

12. **For financial institutions the implication is practical:** chemical risk depends not only on which substances a client or investee company uses, but on how they are produced, used, released, and managed, and on who or what is exposed. This supports a more informed assessment of chemicals-related risks by considering both intrinsic hazards and exposure pathways.

13. **The same hazards, different regulatory definitions across jurisdictions:** This variability is a real challenge for a financial institution assessing portfolio exposure: a chemical classified as **of concern** in one region may not be flagged in another.

- 14. **Substances of Very High Concern (SVHC):** a formal legal designation under the EU REACH Regulation (EC No 1907/2006) covering carcinogenic, mutagenic, reprotoxic (CMRs) substances; persistent, bioaccumulative and toxic (PBTs), and very persistent and very bioaccumulative (vPvB) substances and substances of equivalent concern such as endocrine disruptors. Inclusion on the Substance of Very High Concern (SVHC) Candidate List creates immediate legal obligations in terms of supply chain communication. (ECHA, n.d.)
- 15. **Chemicals of High Concern (CoHC):** used mainly by US state jurisdictions to identify chemicals to which children or vulnerable populations may be exposed, often triggering mandatory reporting requirements for manufacturers. In the corporate metrics literature, the equivalent construct is any carcinogen, mutagen or reproductive toxicant, any Persistent, Bioaccumulative and Toxic (PBT) substance, or any substance with evidence of probable serious effects at an equivalent level of concern (Clean Production Action, 2024).
- 16. **Chemicals or Substances of Concern:** The Strategic Approach to International Chemicals Management (SAICM) identified eight issues of concern (chemicals in products, endocrine-disrupting chemicals, environmentally persistent pharmaceutical pollutants, hazardous substances in electricals/electronics, Highly Hazardous Pesticides (HHPs), lead in paint, nanomaterials, Per- and polyfluoroalkyl substances (PFAS), which UNEP's 2020 assessment tracked as the specific problem groups the international community had already flagged before the GFC's adoption (UNEP, 2020). Other regulatory frameworks provide complementary approaches for identifying substances of concern. For example, the EU Ecodesign for Sustainable Products Regulation (ESPR) (Regulation (EU) 2024/1781) (European Union, 2024) refers to substances of very high concern (SVHCs) identified under REACH, as well as substances falling within specified hazard classes that are largely aligned with the Globally Harmonized System of Classification and Labelling of Chemicals (GHS). These include substances that are persistent, mobile and toxic (PMT) or very persistent and very mobile (vPvM); cause respiratory or skin sensitisation; are chronically hazardous to the aquatic environment or hazardous to the ozone layer; or cause specific target organ toxicity following repeated (STOT-RE) or single (STOT-SE) exposure. The ESPR definition also covers endocrine-disrupting substances, distinguishing between endocrine disruption for human health and for

the environment. These categories can therefore provide a complementary reference for identifying substances of concern. The GFC does not define "chemicals of concern" as a single fixed category with a formal legal definition of its own within the instrument text. Instead, the GFC defines a process to nominate, select and adopt issues of concern.

17. The term chemicals of concern appears under Target D6 (Objective D - safer alternatives): "By 2030, sustainable chemical and waste management strategies have been developed and implemented for major economic and industry sectors that identify priority chemicals of concern and establish standards and measures, such as the chemical footprint approach, to reduce their impact and, where feasible, their input along the value chain" (UNEP, 2023a). So, the GFC treats "chemicals of concern" as a sector-by-sector identification exercise, not a single global list, delegating the actual criteria to measurement approaches it names alongside the target — for example, the chemical footprint approach.

18. To support implementation of Target D6 and related GFC targets, dedicated workstreams on Priority Chemicals of Concern and Chemical Footprint Approaches have been established under the GFC Implementation Programme.

19. The workstream on Priority Chemicals of Concern (CoCs) aims to strengthen global understanding, alignment and action on hazardous chemicals through improved knowledge, guidance and cooperation. Building on initial scoping discussions, the next phase will focus on generating a consolidated mapping of existing regulatory and voluntary approaches that identify, prioritize, and list CoCs. Drawing on this mapping and its analysis, the workstream will develop elements of guidance on the identification of priority CoCs.

20. The Chemical Footprint Approaches workstream aims to advance a common understanding of chemical footprint approaches by harmonizing terminology, developing guidance, and promoting voluntary industry commitments. By building on existing scientific and industry initiatives, it seeks to improve transparency, comparability, and the consistent application of chemical footprint approaches to identify, measure and reduce the impacts of chemicals of concern across value chains. The Chemical Footprint Approaches workstream developed a terminology and methodological framework intended to inform the GFC first International Conference, while laying the foundation for a future international standard (GFC, 2026a).

Box 1 - Target A7 and the specific case of HHPs:

Pesticides and specifically Highly Hazardous Pesticides (HHPs) are arguably unique in that they are deliberately introduced into the environment. The GFC gives HHPs specific attention under Target A7, which calls for stakeholders, by 2035, to take effective measures to phase out HHPs in agriculture where risks have not been managed and where safer and affordable alternatives are available, while promoting the transition to and availability of those alternatives. (UNEP, 2023a)

Identifying which pesticides constitute HHPs is therefore important for implementing Target A7. The joint FAO/WHO framework uses eight criteria for HHP identification, encompassing both acute and chronic hazards to human health and the environment. One of these criteria draws on the WHO Recommended Classification of Pesticides by Hazard, which classifies pesticide active ingredients principally according to acute toxicity, expressed as the oral and dermal median lethal dose (LD50) in rats. The classification ranges from Class Ia (extremely hazardous) to Class U (unlikely to present acute hazard), using the more conservative of the oral and dermal values (WHO, 2020).

WHO class	Hazard	Oral LD50 (rat, mg/kg)	Dermal LD50
Ia	Extremely hazardous	< 5	< 50
Ib	Highly hazardous	5–50	50–200
II	Moderately hazardous	50–2000	200–2000
III	Slightly hazardous	> 2000	> 2000
U	Unlikely to present acute hazard	≥ 5000	—

Complementary approaches have consequently emerged to support HHP identification. The Pesticide Action Network (PAN) International HHP List applies a broader set of hazard criteria and provides a regularly updated list of pesticide active ingredients identified as highly hazardous. The list is intended as a decision-support tool for stakeholders developing pesticide policies, restricted or prohibited lists, and priorities for pesticide risk reduction. It therefore provides a complementary reference for stakeholders seeking to identify and reduce HHP use, while remaining distinct from the official FAO/WHO criteria and national regulatory classifications.

A relatively small proportion of all pesticides are highly hazardous, so removing a small fraction of active ingredients could eliminate most pesticide-related health and environmental harm (UNEP, 2023b). Across 625 pesticides, roughly 20 active ingredients per country account for more than 90% of national applied toxicity (Wolfram et al. 2026).

The **GEF-funded Financing Agrochemical Reduction and Management (FARM) Programme** provides an example of how the transition towards safer alternatives can be supported in practice (GEF FARM, n.d.). FARM aims to reduce pollution from harmful pesticides and agricultural plastics in agrifood value chains by promoting safer alternatives, strengthening enabling environments and mobilising finance. Its finance component, supported by UNEP FI, engages financial institutions to strengthen the integration of pollution-related risks, impacts and opportunities into agricultural finance assessments and decision-making. By supporting the identification of financing needs and the development of appropriate financial solutions, FARM illustrates how financial institutions can contribute to the transition envisaged under GFC Target A7 (UNEP FI, 2025).

The 'known unknowns' problem

21. As new substances are synthesised and as understanding of toxicity, environmental impacts, and exposure pathways improves, the boundary of what is considered hazardous continues to expand. For financial institutions, this implies that risk extends beyond currently regulated substances to those that may be reclassified or newly identified as harmful over time, thus creating a “known unknowns” problem.

22. **Chemicals once considered safe have repeatedly turned out to carry hidden costs:** from asbestos to leaded fuel. Per- and polyfluoroalkyl substances (PFAS) are today's example: a family of thousands of persistent chemicals once valued for non-stick coatings, waterproofing, and firefighting foams, now facing the proposed EU universal restriction under Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (ECHA, 2025) alongside tightening drinking-water limits and national plans such as in the United States, United Kingdom, and elsewhere. What counts as hazardous can shift quickly as evidence accumulates.

23. A second dimension of the problem is **regrettable substitution**: replacing a restricted chemical with a structurally or functionally similar alternative that later proves to have comparable hazards. The recurring examples are bisphenol A (BPA) being replaced by structurally similar bisphenol S (BPS) and bisphenol F (BPF), long-chain PFAS being replaced by short-chain variants with similar persistence (Rochester and Bolden, 2015), and parathion being replaced by chlorpyrifos, one organophosphate HHP by another (OECD, 2021).

24. For financial institutions, this means that chemical risk assessment could extend beyond current regulatory lists to consider emerging scientific evidence, chemicals under regulatory scrutiny, similar substance groups, relevant uses, value-chain exposure pathways, and potential future liabilities. This is particularly important given evidence that the planetary boundary for the introduction of novel entities has already been exceeded, as the production and release of synthetic chemicals outpace the global capacity to assess, monitor, and manage them (Persson, L. et al., 2022).

Hazardous chemicals in the international policy landscape: GFC's focus

25. The Global Framework on Chemicals (GFC) is part of a broader international architecture focused on preventing and reducing risks and adverse impacts from hazardous chemicals and waste across their life cycle, from production and use through to end-of-life and disposal. This architecture comprises legally binding conventions, voluntary frameworks, and international standards that collectively address different sources, stages and dimensions of chemical and waste-related risks. The GFC complements these instruments by providing a broader, life cycle-oriented framework for sound chemicals and waste management, with an emphasis on preventing or, where prevention is not feasible, minimizing harm to human health and the environment.

26. Global chemicals governance is anchored by international agreements and standards such as the Basel, Rotterdam, and Stockholm (BRS) Conventions (UNITAR, n.d.), the Minamata Convention on Mercury (UNEP, n.d.a), the Globally Harmonized System (GHS) (UNECE, 2025) for chemical classification and labelling, and ILO Conventions 155, 170, and 187 (ILO, n.d.), which together provide the international framework for managing hazardous chemicals, waste, and occupational chemical safety. Chemical pollution is also increasingly integrated into broader environmental frameworks. The Kunming-Montreal Global Biodiversity Framework (CBD, 2022a) identifies pollution as a key driver of biodiversity loss, with Target 7 (CBD, 2022b) calling for a 50% reduction in risks from pesticides and highly hazardous chemicals by 2030, reinforcing the links between chemicals management, biodiversity, climate, human health, and sustainable development. A new Intergovernmental Science Policy Panel (ISP-CWP) has also been established in June 2025 to address chemicals, waste and pollution, complementing the international landscape with a science-policy perspective, alongside the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC) (UNEP, 2026).

27. Beyond chemical governance, the international policy landscape increasingly recognizes the interconnectedness of multiple planetary boundaries. Water security frameworks address freshwater depletion and pollution linked to chemical runoff. Nutrient

cycling, particularly nitrogen (N) and phosphorus (P) management, remains a critical but evolving policy area. While there is currently no binding international framework specifically addressing nutrient pollution, international initiatives are advancing greater coordination and action. These include UNEP's Global Partnership on Nutrient Management (GPNM) (UNEP, n.d.b), a global platform bringing together governments, research institutions, the private sector and other stakeholders to promote more sustainable nutrient management, and United Nations Environment Assembly (UNEA) Resolution 4/14 on Sustainable Nitrogen Management (UNEA, 2019), which recognized the need for coordinated action on nitrogen and encouraged the sharing of information, knowledge and good practices. Together, these initiatives represent important steps towards strengthening the international policy response to nutrient pollution, given its fundamental importance to soil health, water quality and aquatic ecosystem integrity.

28. The extraction of rare earth metals and critical minerals remains fragmented across voluntary standards, while fossil fuel energy sources continue to dominate global policy despite climate commitments. These resource-related challenges intersect with chemicals management, as mining operations, fossil fuel extraction, and industrial processing generate significant chemical pollution and environmental degradation. The transition toward circular economy models demands integrated policy approaches that address chemicals, water, nutrient cycles, critical minerals, and energy sources as interconnected systems rather than isolated domains.

29. Within this landscape, the GFC serves as the overarching voluntary multi-stakeholder framework for chemicals and waste beyond 2020. Several of its 28 targets bear directly on financial institutions. Target D3 asks the private sector, including the finance sector, to integrate sound chemicals management into business models and reporting standards by 2030 — the clearest international expectation linking chemicals governance to finance. Target E3 calls for mobilising finance, including through blended-finance schemes, for sound management, in alignment with GFC targets. Target D6 calls for sustainable chemical and waste management strategies across major economic and industry sectors by 2030, including chemical-footprint approaches to reduce impacts along value chains. Together, these targets reflect growing global expectations for stronger disclosure, risk management, and transition away from harmful chemicals.

B. Why are hazardous chemicals important to manage and monitor

30. Hazardous chemicals enter air, water, and soil from many sources, including industrial processes, manufacturing, mining, and consumer products, not agriculture alone. For financial institutions, this pollution creates exposure across lending, investment, and insurance portfolios: contaminated sites lose value, polluting borrowers face cleanup costs and liability claims, and regulatory tightening can strand assets or disrupt operations. These risks sit within credit, market, and reputational exposure across a wide range of sectors, making chemical pollution a material consideration for financial institutions generally, not a niche or sector-specific concern.

Chemicals across the value chain: where hazards emerge

31. Hazardous chemicals can have negative impacts and create risks across the entire life cycle of materials and products from extraction and synthesis, through manufacturing and use, to disposal and circular recovery. Understanding where these hazards emerge is critical for financial institutions assessing exposure.

32. Extraction and primary production generate emissions, hazardous waste, and occupational exposure, with contamination that can persist in soil and groundwater for decades. Manufacturing and processing involve the use of hazardous chemicals such as solvents, catalysts, plasticizers, and flame retardants, which can expose workers and surrounding communities through emissions, wastewater, and spills, while supply chain complexity can obscure these risks. During product use, chemicals such as PFAS, phthalates, flame retardants, and pesticide residues may leach into food, water, and indoor environments, creating widespread human exposure and reputational risks.

33. End-of-life management—including landfilling, incineration, and informal recycling—can create new exposure pathways and, if not well designed, circular economy models may unintentionally recirculate hazardous substances into secondary supply chains. Persistent chemicals, including PFAS, persistent organic pollutants (POPs), and heavy metals, can remain in the environment for decades, bioaccumulate in food chains, and create long-tail environmental and financial liabilities. Consequently, financial institutions may face exposure across the entire value chain through clients, supply chains, contaminated collateral, and legacy liabilities, underscoring the importance of designing out hazardous chemicals and ensuring their sound management throughout the product life cycle.

Double materiality and transmission channels

34. Despite these risks, the production and consumption of hazardous substances is substantial. In 2024, approximately 172 million tonnes of chemicals classified as hazardous to human health were produced in the European Union (Eurostat, 2025). While this represents a 16% decline compared with 2014, the scale of production remains significant. The continued production and use of hazardous chemicals at such volumes, and the associated potential for exposure and pollution across their life cycle highlight the systemic economic and societal risks associated with hazardous chemicals. The market and non-market costs of chemical-pollution inaction could be as high as 10% of global GDP (Grandjean and Bellanger, 2017, cited in UNEP, 2019).

35. Pollution not only negatively affects the environment and human health but can also have financial implications for the polluting organisation itself. A double materiality assessment can help assess these impacts and also help to define which pollution-related information is relevant to disclose (European Commission, 2026). Double materiality helps organisations determine the sustainability-related information to be disclosed from two complementary perspectives: (i) the actual or potential impacts of the organisation on people and the environment, including over the long-term (**impact materiality**), and (ii) the effects that sustainability-related risks and opportunities may have on, among others, the organisation's financial position, including over the long-term (**financial materiality**). A sustainability matter is considered material if it is material from either perspective or from both. For certain investors, long-term impacts can be particularly decision-useful in understanding and evaluating systemic risks across the economy. In the context of pollution, this could mean that cumulative impacts over time can be assessed as material, even if in the short term they may not be deemed as such.

36. Companies and financial institutions are exposed to pollution-related risks, including those associated with hazardous chemicals, through two main routes. **Physical risks** arise from adverse impacts on human health, ecosystems and the services they provide, resulting in higher healthcare costs, reduced labour productivity, disrupted supply chains and declining ecosystem resilience. **Transition risks** arise from misalignment with evolving regulation and policy, legal precedent, technological change, and shifting investor and consumer preferences in response to pollution and hazardous chemicals. These sources transmit through economic effects, at the level of individual businesses and the wider economy, into the established categories of financial risk: credit, market, underwriting, operational, and liquidity. The relationship is endogenous: through the activities they finance, financial institutions contribute to the build-up of the nature-related risk they later carry (TNFD, 2025).

Physical risk arises where pollution degrades the ecosystem services that businesses depend on : Contamination of soil and water, the decline of pollinators, and the loss of natural capital can reduce agricultural yields, raise input and remediation costs, and constrain the productive capacity of the sectors banks finance. Unlike transition risk, which stems from the response to degradation, physical risk materialises from the degradation itself, and can accumulate gradually before manifesting as sudden loss once an ecological threshold is crossed. For financial institutions, these effects transmit through weakening borrower cash flows, impaired collateral in affected regions, and concentrated exposures where portfolios depend on a shared and deteriorating resource base.

Human health impact is one of the significant consequences of hazardous chemicals exposure. Globally, 2 million lives and 53 million disability-adjusted life years (DALYs) were lost in 2019 due to exposure to selected chemicals (WHO, 2023). Exposure can occur throughout the life cycle of chemicals, through occupational settings, consumer products, food, drinking water and environmental contamination and it has been linked to cancers, respiratory and cardiovascular diseases, neurological disorders, reproductive and developmental effects, allergies, and endocrine disruption. These impacts impose substantial

37. **Transmission channels often reinforce and accelerate one another:** Once a substance becomes a “hot topic”, whether through scientific reclassification, media attention, regulatory review, or heightened consumer concern, a ratcheting dynamic can emerge. Consumer awareness can drive regulatory action; regulation can trigger litigation; litigation and media coverage can further intensify public concern and investor pressure, which in turn can accelerate additional regulatory tightening and market responses. For financial institutions, this compounding effect means that pollution and chemicals-related risks can materialise more rapidly and systemically than conventional risk assessment frameworks may anticipate.

Regulatory tightening

38. One of the most immediate transmission channels is **regulatory and compliance risk**. Governments are progressively tightening restrictions on hazardous substances, strengthening corporate disclosure requirements, lowering allowable exposure thresholds, and introducing remediation obligations on companies, driven by concerns about both the environmental and human health impacts. This increases companies’ compliance costs, disrupts existing business models, reduces asset values, and accelerates transition pressures across high-impact sectors. Chemicals previously considered commercially acceptable may become restricted or phased out over relatively short timeframes, creating stranded asset and transition risk exposures for financial institutions. For example, evolving restrictions on PFAS in jurisdictions such as the EU illustrate how

regulatory changes can create substitution, compliance and transition costs for companies using hazardous substances.

39. **Chemicals regulation is tightening globally**. There is increasing convergence toward stricter controls, enhanced disclosure requirements, and life cycle-based approaches to chemicals management. In the EU, REACH (European Commission, n.d.) continues to regulate chemical substances, while the revised European Sustainability Reporting Standards (ESRS), including ESRS E2 on Pollution (European Commission, 2026), retain targeted disclosure requirements for substances of concern and substances of very high concern, subject to materiality assessments, applicability criteria and transitional reliefs. The GRI Standards (GRI, n.d.), widely used internationally and currently being updated, also address aspects of chemicals-related pollution through for instance disclosures on water and effluents (GRI 303) and waste (GRI 306). In the United States, the Toxic Substances Control Act (US EPA, n.d.) is enhancing EPA authority to assess and regulate chemicals, while China (Ministry of Ecology and Environment, 2023) and Japan (Government of Japan, 1973, as amended) are strengthening hazardous chemicals regulation, including controls on PFAS. More broadly, countries are increasingly aligning with Globally Harmonized System of Classification and Labelling of Chemicals (GHS) and REACH-inspired approaches, raising compliance expectations across global value chains.

40. Once a substance is restricted in a major jurisdiction, trade pressures and supply chain requirements may influence how companies operating globally manage the substance across their operations. Companies operating globally may increasingly align with the strictest applicable standards rather than maintain different systems across markets. At the same time, regulatory progression is not always linear. Factors such as political priorities and competitiveness concerns can delay or reshape reforms resulting in divergent regulatory requirements across jurisdictions. Such divergence can itself create financial risks for companies and financial institutions, including through restricted market access, stranded products and increased compliance complexity. It also underscores the importance of voluntary chemicals-related disclosure and risk management, particularly where mandatory requirements are limited or scaled back.

41. For financial institutions, the key issue is therefore not only whether clients or investees comply with current regulations, but whether their business models are resilient to future regulatory harmonisation and tightening. Regulatory uncertainty itself can become a material risk factor, particularly for sectors dependent on substances under scientific or regulatory scrutiny. Regulatory uncertainty can impact the future compliance landscape and slow progression towards more stringent environmental and social safeguards (CIEL, 2025).

Litigation as a leading indicator

42. A second transmission channel is litigation and liability risk. Pollution can create substantial liabilities, remediation obligations, and legal costs for corporates and their financiers. High-profile examples such as PFAS demonstrate how scientific evidence, regulatory scrutiny, and litigation can rapidly converge, generating significant financial consequences across value chains. In practice, litigation often follows emerging scientific evidence, while regulation tends to take longer to take effect compared to scientific and market perception.

43. Growing scientific concern regarding persistence, contamination, and potential health impacts of PFAS led to increasing public scrutiny and legal claims against manufacturers years before comprehensive regulatory action emerged across many jurisdictions and resulted in multibillion-dollar settlements linked to drinking water contamination and remediation obligations (Wotton Kearney, 2025). Similarly, glyphosate-related litigation accelerated following scientific assessments by the International Agency for Research on Cancer classifying glyphosate as “probably carcinogenic to humans,” despite continued scientific and regulatory debate globally regarding causality and acceptable exposure levels (Portier, C.J. et al., 2016). Litigation and market impacts emerged even in the absence of fully harmonised international regulatory positions.

44. For banks, these risks may materialise through deteriorating borrower credit quality, declining collateral values, insurance losses, or broader portfolio instability. These developments are also reshaping insurance markets, with some insurers tightening underwriting standards, restricting coverage, or introducing exclusions for PFAS-related liabilities as claims uncertainty and potential losses increase. Similar considerations are emerging in investment portfolios; for example, some asset managers have introduced exclusions for companies with significant exposure to hazardous chemicals or pesticides, while others are using engagement to encourage companies to phase out substances such as PFAS.

45. These liabilities take several forms, and each reaches a financier by a different route:

- 46. ***Product and personal-injury (mass-tort) claims*** — such as the glyphosate litigation, which reached around US$11 billion across nearly 100,000 lawsuits (Lawsuit Information Center, n.d.) erode a borrower's earnings and solvency, and with them its credit quality; for investors they affect share prices, litigation reserves, and directors' and officers' insurance cover.
- 47. ***Environmental and remediation liability*** — the duty to investigate and clean up contaminated sites, as with PFAS, can create substantial, long-tailed financial

obligations that reduce borrowers' repayment capacity and depress the value of contaminated land held as collateral. In the United States, 3M agreed to a settlement of up to US$12.5 billion to resolve PFAS contamination claims brought by public water suppliers (3M Company, 2024), while the U.S. Department of Defense estimates that PFAS investigation and cleanup at military installations alone will exceed US$9.3 billion, with costs expected to continue rising as contamination is further characterised (GAO, 2025). Under regimes such as the United States' CERCLA, a lender that takes ownership of or helps manage a contaminated site may itself incur clean-up liability, while acquirers and their financiers can inherit exposure through successor liability (US EPA, 2023).

- 48. ***Securities and disclosure liability*** — alleged misstatement or non-disclosure of chemical risks — adds a route through shareholder claims and regulator action. For example, Johnson & Johnson has faced securities class action litigation alleging that it failed to adequately disclose alleged asbestos contamination risks associated with its talc products, resulting in investor claims under U.S. federal securities laws (Johnson & Johnson, 2025).

49. Clearly science does not need to be universally “settled” for litigation risk to materialise. Perception of harm, whether driven by emerging studies, media attention, advocacy campaigns, or consumer concern, can itself generate substantial financial and reputational exposure. Once public concern intensifies, litigation can accelerate rapidly, prompting investor scrutiny, regulatory reviews, remediation requirements, and shifts in consumer and market behaviour. For financial institutions, this means that reliance solely on current regulatory classifications may underestimate risk exposure, particularly for substances already under scientific scrutiny or public debate.

50. Litigation functions as an early warning signal of potential transition, liability, and reputational risks across portfolios. Monitoring emerging scientific evidence, litigation trends, and societal concern may become as important as tracking formal regulatory developments, particularly in sectors with high exposure to hazardous chemicals and pollution-intensive activities.

Market and reputational risks

51. Hazardous chemicals also create market and reputational risks, particularly as consumer awareness and civil society scrutiny increase. Public concern regarding chemicals in food systems, textiles, cosmetics, packaging, electronics, plastics, and consumer products can rapidly alter consumer demand, investor sentiment, and supply chain relationships. Recent U.S. research found that more than 70% of adults are concerned about exposure to harmful chemicals in food and drinking water, while 83% want companies to provide more information about chemicals in their products (The Pew

Charitable Trusts, 2026). Broader global research also points to changing purchasing preferences: an Accenture survey of 6,000 consumers across 11 countries found that 72% were buying more environmentally friendly products than five years earlier, while 81% expected to increase such purchases over the following five years (Accenture, 2019). These shifts can create market and reputational risks for companies that fail to respond to changing consumer expectations, while creating opportunities for those investing in safer and more sustainable products and alternatives. Increasing public attention can accelerate policy action and shift expectations around corporate transparency, pollution reduction, and safer alternatives.

52. Reputational damage can result in market responses, particularly for consumer-facing goods, where a single contamination finding can trigger product recalls and rapid loss of consumer trust. High-profile cases illustrate how these concerns can translate into financial consequences: litigation and public scrutiny surrounding Johnson & Johnson's talc-based baby powder (Johnson & Johnson, 2026) contributed to extensive legal costs and the eventual discontinuation of talc-based baby powder globally, demonstrating how concerns over chemicals in widely used consumer products can develop into interconnected reputational, legal and market risks. Financial institutions could also consider a less visible pathway: chemicals used far upstream, in industrial processing, textile manufacture, or packaging, can persist through the value chain and surface as a residual contaminant in a finished consumer product or the environment, long after the original producer's involvement. Banks financing producers of hazardous and persistent chemicals can carry this reputational exposure even without a direct relationship to the consumer-facing brand ultimately affected.

53. Investor coalitions have already moved from concern to organised pressure. The Investor Initiative on Hazardous Chemicals, coordinated by ChemSec and representing over 80 institutional investors with more than US$23 trillion under management or advice, has asked the world's largest chemical producers to disclose their exposure to hazardous substances, publish time-bound phase-out plans for persistent chemicals, and invest in safer alternatives (ChemSec, 2024b). The Chemical Footprint Project, backed by investor signatories holding over US$3 trillion in assets under management, benchmarks companies annually on their progress away from chemicals of high concern (Clean Production Action, 2024). These initiatives illustrate how chemicals-related risks and companies' management of hazardous substances are increasingly becoming considerations in investor engagement and assessments of portfolio companies.

The data gap: why is chemical risk hard to see?

54. A major challenge for financial institutions is that chemicals-related risks remain difficult to identify, quantify, and monitor consistently across portfolios. In many cases, financial institutions are currently not able to assess hazardous chemical exposure adequately due to significant gaps in data availability, disclosure, and scientific "certainty".

55. **Limited corporate disclosure**, across the entire value chains, regarding chemical use, emissions, waste streams, and downstream impacts is a major barrier. Chemicals-related information remains fragmented, inconsistent, and often commercially sensitive. Existing reporting systems vary significantly across jurisdictions, while many chemicals are embedded deep within complex global supply chains with limited traceability. As a result, financial institutions often lack sufficient information to understand where hazardous chemicals are being produced, used, emitted, or accumulated within clients, investee companies and their value chains.

56. **The complexity and scale of the challenge is substantial**: There are more than 350,000 chemicals and mixtures registered for production and use worldwide — including tens of thousands whose composition is confidential or only ambiguously described (Wang, Z. et al., 2020). This is far larger than the number ever assessed, but far smaller than the CAS Registry's more than 200 million recorded substances, most of which have never been produced commercially and do not represent chemicals in commerce. National inventories also under-represent much of South America, Africa, and Asia, primarily due to limited public reporting requirements and lack of comprehensive national chemical inventory databases. In Europe, about 26,600 substances are registered under EU REACH, while the European Pollutant Release and Transfer Register requires reporting on 91 pollutants (Regulation (EC) No 166/2006) (European Union, 2006). The gap between what is in commerce and what is assessed or disclosed is the core problem for financial institutions[1] (Planet Tracker, n.d.).

57. **Data gaps create a structural challenge for effective risk management:** Traditional environmental and social risk assessment frameworks are often not designed to capture diffuse, long-tail, and evolving chemicals-related risks across portfolios. Even where chemicals-related reporting exists, available metrics may not provide the granularity needed for portfolio-level risk assessment. For example, ESRS E2 includes quantitative disclosures on pollutants and substances of concern, but such reporting may

not provide sufficiently granular information on chemical exposure and management across complex value chains; meanwhile, the ISSB standards do not currently prescribe a dedicated cross-industry metric for hazardous-chemical exposure. Worker exposure to hazardous chemicals may also be addressed through sustainability reporting frameworks, including ESRS S2 on workers in the value chain and relevant industry-specific SASB Standards, which cover aspects of workforce health and safety and hazardous substances management. These disclosures can provide financial institutions with insights into how clients or investee companies identify and manage chemicals-related risks, although the availability and granularity of such information vary across sectors and reporting frameworks. Improving chemical hazard assessment transparency, disclosure, traceability, and access to decision-useful data will therefore be critical to strengthening portfolio-level understanding of hazardous chemical exposure and future financial risk.

C. How financial institutions can respond

58. Before targeting specific interventions, financial institutions need a clear view of where chemical and pollution impacts and risks sit across their portfolios. This starts with sectoral and portfolio-level mapping: overlaying lending and investment exposure against sectors and geographies with elevated chemical intensity — e.g. agriculture, chemicals manufacturing, mining, textiles, some consumer goods categories, and related value chains — to locate hotspots of both environmental and human health impact and financial materiality.

Impact mapping

59. Portfolio-level tools such as UNEP FI's Portfolio Impact Analysis Tools (UNEP FI, 2023), ENCORE (UNEP FI, 2022), and comparable sector-risk datasets can help institutions to translate broad exposure into a structured baseline: which clients or investees and sub-portfolios carry the highest impact intensity, where regulatory or reputational exposure is rising fastest, and where data gaps are most acute. For hazardous chemicals specifically, these tools have a material limitation: they operate at sector or sub-industry resolution rather than the individual client or asset, and their pollutant coverage, soil and water pollutants in particular, is not yet exhaustive, which can make chemical-intensive exposure look lower risk than it is (Grönlund & Bhattacharjee, 2025). Used alone, they can serve as a first-pass screen, not a chemicals-specific risk measure.

60. More targeted tools exist to close that gap once a hotspot sector or geography is identified. The OECD's harmonised PRTR pollutant lists give facility-level reporting a common reference point, including a class of 260 plant-protection and biocide active substances (OECD, 2022). Chemical footprinting approaches can then be applied at client or investee level to benchmark chemicals-management performance and impact once a hotspot sector and geography is identified (Bjørn et al., 2014). Where more granular assessments are required, sector- and chemical-specific toxicity-weighted metrics can further refine exposure and impact assessments. For example, the Aggregated Total Applied Toxicity (ATAT) indicator, adopted as the official indicator for GBF Target 7 (Wolfram, J. et al., 2026), converts raw chemical application volumes into hazard-weighted measures, enabling institutions to distinguish between chemicals based on their relative potential to cause harm rather than volume alone.

61. These mapping exercises are a targeting device, signalling to an institution where to concentrate due diligence, engagement, and product development, and where risk is diffuse enough that portfolio-wide policy measures are more efficient than client-by-client review. The output can be a prioritised set of sectors and clients or investees for deeper assessment, feeding directly into activities such as capability-building and due-diligence described below. Similar processes are used by investment management firms to identify individual company, fund and overall portfolio risk exposures.

Build internal capabilities

62. Managing chemical risk means more than removing hazardous substances. For many clients or investee companies the nearer-term priority is sound management — safe handling, storage and disposal, worker health and safety, and the management systems that control exposure consistent with the ILO occupational-safety and chemicals conventions (ILO 155, 170 and 187). A financial institution can look at both dimensions: whether a client or investee company is reducing its reliance on hazardous chemicals, and how well it manages those it continues to use.

63. For financial institutions, integrating hazardous chemicals and waste considerations into risk frameworks requires a more targeted identification of chemicals-related exposures across portfolios. A practical starting point is mapping exposure to sectors with elevated chemicals- and pollution-related risks including agriculture, chemicals manufacturing, mining and metals, textiles, electronics, plastics, pharmaceuticals, and waste management, using sector proxies, client questionnaires, and third-party datasets. Existing environmental and social due diligence processes can be strengthened by incorporating questions relating to hazardous chemical use, emissions, waste streams,

occupational health and safety, chemical management systems, regulatory compliance, pollution incidents, supply chain traceability, and preparedness for emerging restrictions.

64. Given current data limitations, institutions are unlikely to have perfect visibility into chemicals-related impacts and risks. As a result, building internal capabilities requires risk- and hazard-informed and precautionary approaches that combine available disclosure, sector expertise, scientific evidence, and regulatory trend analysis. Over time, financial institutions may increasingly need dedicated internal expertise capable of interpreting chemical transition risks, emerging contaminants, and evolving disclosure expectations. Strengthening these capabilities is therefore not only a response to current information gaps, but also an important step towards embedding chemicals and waste considerations into mainstream risk management and business decision-making. The Global Framework on Chemicals (GFC) Target D3 reinforces this direction by stating that by 2030, “the private sector, including the finance sector, incorporates sound management of chemicals and waste into their strategies and approaches,” reinforcing expectations that financial institutions progressively integrate chemicals and waste considerations into policies, investment strategies, and business models.

Supporting client or investee company transition

65. Engaging with clients or investees provides financial institutions with a way to assess how they identify, manage and reduce hazardous chemical impacts and comply with regulatory expectations, and proactively go beyond what can be inferred from regulatory compliance alone. Engagement can be particularly valuable when clients are seeking financing or other support from a financial institution, as financing discussions can provide insight into the practical transition challenges companies face, the solutions they are pursuing and the types of financing required to implement them. Direct dialogue with companies may cover the use of hazardous chemicals of various types, governance and accountability for chemicals management, inventories of substances used across operations and supply chains, substitution strategies for hazardous chemicals, preparedness for emerging regulations, pollution prevention measures, occupational health and safety practices, waste and effluent management, and the robustness of chemical management systems. Understanding how clients or investees monitor chemical use, assess alternatives, manage legacy contamination and strengthen supply chain traceability can provide valuable insight into operational resilience and future transition risks, which can feed into investment or lending decisions. Across a portfolio, these interactions can also generate valuable market intelligence on recurring transition challenges, financing needs and solutions that have proved viable in practice. Financial institutions can leverage this client intelligence to identify common or scalable financing

opportunities and inform the development of transition financing strategies and financial products that respond to demonstrated market needs.

66. Client or investee engagement can also help accelerate the transition towards safer chemicals management by encouraging better disclosure and the development of business models that move away from hazardous chemicals to safer solutions. Financial institutions can work with clients or encourage investees to establish time-bound chemical transition plans, improve reporting on chemical production or use, and associated revenues, as well as pollution from facilities, strengthen due diligence and supplier engagement, invest in safer substitutes, green chemistry and cleaner production technologies, and enhance monitoring of chemicals-related impacts and dependencies across value chains. As scientific evidence, regulatory expectations and litigation continue to evolve, ongoing engagement enables financial institutions to identify emerging risks at an earlier stage and support capital allocation towards business models that are better positioned for an increasingly stringent regulatory landscape, avoid litigation and associated costs, and which generate lower environmental and social impacts.

Managing portfolio exposure

67. Insights gained through sectoral and portfolio-level assessments can help financial institutions identify activities with elevated chemicals-related impacts and risks, understand clients' or investees' dependence on hazardous substances, evaluate transition preparedness, and assess exposure to evolving regulatory, litigation and liability risks. They can also help identify concentrations of exposure across sectors, geographies and value chains, providing a stronger basis for prioritising due diligence, client engagement and portfolio monitoring. These insights can inform lending, investment and underwriting decisions, helping institutions better price risk, identify concentrations of exposure, and anticipate potential stranded assets or deteriorating credit quality associated with hazardous chemicals.

68. Beyond managing downside risk, portfolio composition also creates opportunities to direct capital towards safer and more resilient business models. Integrating chemicals considerations into sector strategies, transition finance frameworks and sustainable finance products can help align capital allocation with emerging policy objectives under the GFC, while supporting long-term portfolio resilience in response to tightening regulation, changing market expectations and growing demand for safer products and value chains. Over time, these insights can also support portfolio rebalancing, the integration of chemicals-related considerations into sector strategies and financing or investment decisions, and increased financing or investment for businesses adopting

safer alternatives, green and sustainable chemistry, pollution prevention technologies, resource-efficient production processes and circular solutions.

Proactive stakeholder engagement as a risk management tool

69. Since the category of hazardous chemicals continues to evolve alongside scientific understanding, regulation, and public concern, proactive stakeholder engagement may become one of the most important risk management tools available to financial institutions. Regulatory lists alone are unlikely to provide sufficient forward-looking visibility. Instead, institutions may increasingly need to engage with scientific bodies, regulators, standard setters, industry associations, civil society organisations, and technical experts to better understand emerging risks, evolving evidence, and likely future policy trajectories.

70. Participation in the development of policy or disclosure frameworks, chemical footprint methodologies, taxonomy approaches, and sector-specific guidance can further support more consistent, decision-useful approaches to chemical risk assessment. In this context, stakeholder engagement is a mechanism for anticipating transition, liability, and reputational risks before they materialise financially.

Emerging practices: what leading financial institutions are doing

71. Beyond identifying hazardous chemicals as a risk, a growing number of financial institutions are acting on it, through collaborative engagement, benchmarking tools, and the integration of chemicals-related considerations into financing or investment policies, client or investee engagement and financial decision-making. A few examples of emerging practices (non-exhaustive) are provided below:

72. **Collaborative engagement & investor pressure:** Coordinated stewardship is emerging as one of the most developed practices. Through ChemSec's Investor Initiative on Hazardous Chemicals (IIHC), more than 80 investors managing over US$23 trillion are engaging major chemical companies to reduce their hazardous chemical footprint, increase transparency on the production volumes of hazardous substances, and set time-bound phase-out plans for persistent chemicals such as PFAS (ChemSec, 2025a). This type of investor pressure also extends to downstream companies. In July 2025 the Investor Environmental Health Network (IEHN) issued the first safer-chemical-management recommendations directed at consumer-facing brands, grounded in more than 60 shareholder-resolution narratives and citing chemicals including PFAS, phthalates and bisphenol A as sources of reputational, legal and market risk. The IEHN resource also points to leading chemical-management policies and practices adopted by retailers and manufacturers such as Sephora, Ulta, Apple and Target (IEHN, 2025). In

June 2025, in the margins of the Global Framework on Chemicals process, more than 44 investors representing over US$4 trillion, in a call coordinated by ShareAction, ChemSec, IEHN, Planet Tracker and others, issued parallel statements to the chemical industry and to governments, aligning their demands with the pollution and biodiversity goals of the Global Framework on Chemicals and the Kunming-Montreal Global Biodiversity Framework (ShareAction, 2025).

73. **Benchmarking and external data:** Financial institutions increasingly use chemicals-specific benchmarks to direct engagement and screen exposure. ChemSec's ChemScore ranks the world's roughly 40 largest listed chemical producers by their handling of hazardous substances and PFAS, allowing investors to track progress year on year and prioritise engagement (ChemSec, 2025b). Because generic environmental, social and governance disclosure is insufficient for chemicals due diligence, investors also draw on external providers such as MSCI, Sustainalytics and Bloomberg, whose research on regulatory readiness and PFAS liability feeds credit-risk models (Sustainalytics, 2023), and on pre-competitive hazard-data platforms including ChemFORWARD's Chemical Hazard Data Trust and the Chemical Footprint Project, which structure substance-level hazard data for portfolio use (Perrott, A., 2026), as well as USEtox, a harmonised scientific consensus model to quantify environmental characterisation factors for human toxicity and freshwater ecotoxicity within life cycle impact assessment frameworks (USEtox, n.d.).

74. **Risk modelling and proprietary risk tools**: Some financial institutions have built proprietary tools that link a company's financial profile to its material risks — including regulatory and pollution risks — and rank exposures by financial materiality. For many chemical companies, pollution ranks among the most financially material risks, with modelled effects on assets, liabilities, revenues, expenses, and cash flow. Natural-language processing is increasingly used to sift large volumes of unstructured data and surface the most decision-relevant information for these tools.

75. **Linking loan pricing to hazardous waste reduction – Bank of Beijing, Suzhou Branch**: Suzhou provides an emerging example of how chemicals management can be incorporated into green and transition finance frameworks. Building on China’s Catalogue of Green Finance Support Projects (2025 Edition), Suzhou has prioritised financing for activities including the substitution of non-toxic and harmless raw materials and products, low-toxicity and low-residue pesticides, and pollution-control solutions for chemicals regulated under international conventions. In parallel, the development of a transition finance catalogue for the textile industry explicitly supports technologies aimed at reducing chemical use, including in pretreatment, printing, dyeing and finishing processes. This illustrates how policy frameworks, classification criteria and sector-specific transition

pathways can help direct financial flows towards chemical-use reduction, substitution and improved chemicals management at a broader market level.

76. The Suzhou Branch of Bank of Beijing is integrating chemicals and waste considerations into its sustainable finance activities through green and transition lending. In June 2025, the bank issued a RMB 20 million (approximately US$2.8 million) sustainability-linked working capital loan that linked interest rate pricing to the borrower's ESG performance and hazardous waste intensity, including waste from chemical packaging. Performance against defined and measurable KPIs was assessed through third-party verification, with achievement of the targets resulting in a 0.05% reduction in the loan interest rate. The bank has also supported transition finance for chemical companies: in April 2026, it facilitated a RMB 10 million (approximately US$1.4 million) transition finance loan for a polymer chemicals company in Suzhou, alongside a transition plan covering emission reduction, financing, governance and social responsibility. The company is projected to reduce annual carbon emissions by approximately 1,580 metric tonnes by 2030. For the bank, these transactions demonstrate how chemicals- and waste-related considerations can be incorporated into lending criteria, interest-rate incentives and transition-finance solutions. These examples illustrate how lending terms and financial incentives can be linked to improvements in hazardous waste management, ESG performance and the transition of chemical-sector companies.

77. Taken together, these emerging practices show that financial institutions can progressively strengthen their approach to hazardous chemicals by identifying priority exposures, building internal capabilities, strengthening due diligence and client or investee engagement, and integrating chemicals-related considerations into portfolio and financing decisions. This can help institutions better anticipate emerging risks while identifying opportunities to finance safer alternatives and more resilient business models.

References

1. Accenture (2019). ‘More than Half of Consumers Would Pay More for Sustainable Products Designed to Be Reused or Recycled, Accenture Survey Finds’. Available at: https://newsroom.accenture.com/news/2019/more-than-half-of-consumers-would-pay-more-for-sustainable-products-designed-to-be-reused-or-recycled-accenture-survey-finds
2. Bjørn (2014). ‘Chemical footprint method for improved communication of freshwater ecotoxicity impacts in the context of ecological limits’. Environmental Science & Technology. Available at: https://doi.org/10.1021/es503797d
3. Center for International Environmental Law (CIEL) (2025). ‘EU Bends to Chemical Lobby: Consumers, Health, and Environment Left Hanging’. Available at: https://www.ciel.org/news/eu-bends-chemical-lobby-consumers-health-environment-left-hanging/
4. Clean Production Action (2024). ‘7th Chemical Footprint Project Report: 2023 Survey Results’. Available at: https://chemicalfootprint.org/
5. Convention on Biological Diversity (CBD) (2022a). Kunming-Montreal Global Biodiversity Framework. Montreal: Secretariat of the Convention on Biological Diversity. Available at: https://www.cbd.int/gbf/introduction
6. Convention on Biological Diversity (CBD) (2022b). Kunming-Montreal Global Biodiversity Framework: Target 7 – Reduce Pollution to Levels That Are Not Harmful to Biodiversity. Available at: https://www.cbd.int/gbf/targets/7
7. European Central Bank (2023). ‘The economy and banks need nature to survive’. Available at: https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog230608~5cffb7c349.en.html
8. European Chemicals Agency (ECHA) (2025). ECHA publishes updated PFAS restriction proposal. Available at: https://www.echa.europa.eu/-/echa-publishes-updated-pfas-restriction-proposal
9. European Chemicals Agency (ECHA) (n.d.). ‘Candidate List of Substances of Very High Concern for Authorisation’. Available at: https://echa.europa.eu/candidate-list-table
10. European Commission (2026). Commission Delegated Regulation (EU) 2026/1563 of 3 July 2026 amending Delegated Regulation (EU) 2023/2772 as

regards the simplification of certain sustainability reporting standards. Annex I, ESRS 1 – General Requirements. Available at: https://eur-lex.europa.eu/eli/reg_del/2026/1563/oj

11. European Commission (n.d.). REACH Regulation. Directorate-General for Environment. Available at: https://environment.ec.europa.eu/topics/chemicals/reach-regulation_en
12. European Union (2024). Regulation (EU) 2024/1781 of the European Parliament and of the Council of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products. Available at: https://eur-lex.europa.eu/eli/reg/2024/1781/oj/eng
13. European Union (2006). Regulation (EC) No 166/2006 of the European Parliament and of the Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register. Available at: https://eur-lex.europa.eu/eli/reg/2006/166/oj
14. Eurostat (2025). 'EU chemical production: -15% over 10 years'. Eurostat News, 16 December. Available at: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20251216-1
15. Food and Agriculture Organization of the United Nations (FAO) (n.d.). 'Highly Hazardous Pesticides (HHPs): Introduction. Pesticide Registration Toolkit'. Available at: https://www.fao.org/pesticide-registration-toolkit/special-topics/highly-hazardous-pesticides-hhp/introduction/en/
16. GEF FARM (n.d.). 'Financing Agrochemical Reduction and Management (FARM) Programme'. Available at: https://www.geffarm.org/
17. Global Framework on Chemicals (GFC) (2026). 'Chemical Footprint - Terminology and Methodological Framework. Global Framework on Chemicals, UNEP'. Available at: https://iomcwebinars.org/chemical-footprint-approaches
18. Global Framework on Chemicals (GFC) (2026b). 'Briefing Note: Safer Alternatives – Why they matter to financial institutions'. GFC Private Sector Financing and Investment Workstream. Available at: https://iomcwebinars.org/wp-content/uploads/Briefing-note-Safer-alternatives-What-they-entail-for-financial-institutions.pdf
19. Global Reporting Initiative (GRI) (n.d.). GRI Standards (English language). Available at: https://www.globalreporting.org/how-to-use-the-gri-standards/gri-standards-english-language/

20. Government of Japan (1973, as amended). ‘Act on the Regulation of Manufacture and Evaluation of Chemical Substances’ (Act No. 117 of 1973). Available at: https://www.japaneselawtranslation.go.jp/en/laws/view/3350/en

21. Grandjean, P. and Bellanger, M. (2017). ‘Calculation of the disease burden associated with environmental chemical exposures: Application of toxicological information in health economic estimation’. Environmental Health, 16, Article 123. Available at: https://doi.org/10.1186/s12940-017-0340-3

22. Grönlund, A. and Bhattacharjee, A. (2025). ‘Mapping biodiversity risk metrics in finance: A comparative analysis of MSCI and LSEG using the ENCORE framework’. Nature-Based Solutions, 7, Article 100227. Available at: https://doi.org/10.1016/j.nbsj.2025.100227

23. Intergovernmental Panel on Climate Change (IPCC) (2012). ‘Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change.’ Available at: https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap2_FINAL-1.pdf

24. International Chemical Secretariat (ChemSec) (2024a). ‘The Problem with Chemicals. ChemScore’. Available at: https://chemscore.chemsec.org/about/the-problem-with-chemicals/

25. International Chemical Secretariat (ChemSec) (2024b). ‘A Profitable Detox: Why Safer Chemistry Makes Financial Sense’. Available at: https://chemsec.org/reports/a-profitable-detox-why-safer-chemistry-makes-financial-sense/

26. International Chemical Secretariat (ChemSec) (2025a). ‘Investor Initiative on Hazardous Chemicals: 2025 Progress Report’. Available at: https://chemsec.org/app/uploads/2025/11/IIHC_Progress-Report-2025_FINAL-EXTERNAL.pdf

27. International Chemical Secretariat (ChemSec) (2025b). ‘ChemScore 2025 – Key Findings’. Available at: https://chemsec.org/reports/chemscore-2025-key-findings/

28. International Labour Organization (ILO) (n.d.). ‘Fundamental Conventions on Occupational Safety and Health’. Available at: https://www.ilo.org/publications/fundamental-conventions-occupational-safety-and-health

29. Investor Environmental Health Network (IEHN) (2025). ‘Safer Chemical Management Recommendations for Consumer-Facing Brands’. Available at: https://iehn.org/resources

30. Johnson & Johnson (2025). Form 10-Q: Quarterly Report for the Period Ended 28 September 2025. Filed with the U.S. Securities and Exchange Commission (SEC). Available at: https://www.sec.gov/Archives/edgar/data/200406/000020040625000209/jnj-20250928.htm

31. Johnson & Johnson (2026). Form 10-Q: Quarterly Report for the Period Ended 28 June 2026. Filed with the U.S. Securities and Exchange Commission (SEC). Available at: https://www.sec.gov/Archives/edgar/data/200406/000020040626000153/jnj-20260628.htm

32. 3M Company (2024). 2023 Annual Report. Available at: https://www.sec.gov/Archives/edgar/data/66740/000130817924000309/mmm4298631-ars.pdf

33. Lawsuit Information Center (n.d.). Roundup Lawsuit: Updates and Settlement Information. Available at: https://www.lawsuit-information-center.com/roundup-lawsuit.html

34. Organization for Economic Co-operation and Development (OECD) (2021). ‘Guidance on Key Considerations for the Identification and Selection of Safer Chemical Alternatives’. Available at: https://www.oecd.org/en/publications/guidance-on-key-considerations-for-the-identification-and-selection-of-safer-chemical-alternatives_a1309425-en.html

35. Organization for Economic Co-operation and Development (OECD) (2022). ‘Harmonized List of Pollutants for Pollutant Release and Transfer Registers (PRTRs)’. OECD Series on Pollutant Release and Transfer Registers, No. 26, ENV/CBC/MONO(2022)5. Available at: https://one.oecd.org/document/ENV/CBC/MONO(2022)5/en/pdf

36. Perrott, A. (2026). ‘Scaling Up Investment in Sustainable Chemistry: Challenges, Opportunities and Lessons from Green Finance and Investment Experience’. Background paper for the OECD Workshop on Financing Sustainable Chemistry, 29–30 June 2026. Organisation for Economic Co-operation and Development (OECD). Available at:

https://www.oecd.org/content/dam/oecd/en/events/2026/06/oecd-workshop-on-sustainable-chemistry/scaling-up-background.pdf

37. Persson, L. et al. (2022). ‘Outside the Safe Operating Space of the Planetary Boundary for Novel Entities’. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC8811958/

38. Planet Tracker (n.d.). ‘Evaluating the Risk of Synthetic Chemical Pollutants’. Available at: https://planet-tracker.org/evaluating-the-risk-of-synthetic-chemical-pollutants/

39. Portier, C.J. et al. (2016). ‘Differences in the carcinogenic evaluation of glyphosate between the International Agency for Research on Cancer (IARC) and the European Food Safety Authority (EFSA)’. Journal of Epidemiology and Community Health. Available at: https://pmc.ncbi.nlm.nih.gov/articles/PMC4866614/

40. Ministry of Ecology and Environment (2023). ‘List of New Pollutants for Priority Control (2023 Edition)’. Order No. 28, effective 1 March 2023. Available at: https://www.gov.cn/zhengce/2022-12/30/content_5734728.htm

41. Rochester and Bolden (2015). ‘Bisphenol S and F: A Systematic Review and Comparison of the Hormonal Activity of Bisphenol A Substitutes’. Available at: https://pubmed.ncbi.nlm.nih.gov/25775505/

42. ShareAction (2025). ‘Investor Statements on Chemicals and Biodiversity 2025’. Available at: https://shareaction.org/chemicals-and-biodiversity-investor-statements-2025

43. Sustainalytics (2023). ‘Regulating ‘Forever’ Chemicals: Examining Company Readiness and Investor Risk’. Available at: https://www.sustainalytics.com/esg-research/resource/investors-esg-blog/regulating-forever-chemicals--examining-company-readiness-and-investor-risk

44. Taskforce on Nature-related Financial Disclosures (TNFD) (2025). ‘Evidence Review on the Financial Effects of Nature-related Risks’. Available at: https://tnfd.global/wp-content/uploads/2025/06/25-28225_Evidence-review-on-the-financial-effects-of-nature-related-risks_DIGITAL.pdf

45. The Pew Charitable Trusts (2026). ‘Americans Are Concerned About Harmful Chemicals in Food, Water and Everyday Products’. Available at: https://www.pew.org/en/research-and-analysis/articles/2026/02/26/americans-are-concerned-about-harmful-chemicals-in-food-water-and-everyday-products

46. UNECE (2025). Globally Harmonized System of Classification and Labelling of Chemicals (GHS Rev. 11, 2025). Available at: https://unece.org/transport/dangerous-goods/ghs-rev11-2025

47. United Nations Environment Assembly (UNEA) (2019). 'Sustainable Nitrogen Management. Resolution UNEP/EA.4/Res.14'. Available at: https://digitallibrary.un.org/record/3982462

48. United Nations Environment Programme (UNEP) (2019). 'Global Chemicals Outlook II: From Legacies to Innovative Solutions. Synthesis Report'. Available at: https://www.unep.org/resources/report/global-chemicals-outlook-ii-legacies-innovative-solutions

49. United Nations Environment Programme (UNEP) (2020). 'An Assessment Report on Issues of Concern: Chemicals and Waste Issues Posing Risks to Human Health and the Environment'. Available at: https://www.unep.org/resources/report/assessment-report-issues-concern-chemicals-and-waste-issues-posing-risks-human

50. United Nations Environment Programme (UNEP) (2023a). Global Framework on Chemicals – For a Planet Free of Harm from Chemicals and Waste. Available at: https://www.unep.org/global-framework-chemicals/framework

51. United Nations Environment Programme (UNEP) (2023b). 'Alternatives to highly hazardous pesticides: Action that can be taken to eliminate or significantly reduce the risks to health and the environment that result from the use of highly hazardous pesticides - Guidelines on Alternatives to Highly Hazardous Pesticides'. Available at: https://wedocs.unep.org/items/745eaedc-9c03-48fd-99ce-55aea2ce2ba1

52. United Nations Environment Programme (UNEP) (2026). Intergovernmental Science-Policy Panel on Chemicals, Waste and Pollution. Available at: https://www.unep.org/isp-cwp

53. United Nations Environment Programme (UNEP) (n.d.a). Minamata Convention on Mercury. Available at: https://minamataconvention.org/en

54. United Nations Environment Programme (UNEP) (n.d.b). Global Partnership on Nutrient Management (GPNM). Available at: https://www.unep.org/topics/ocean-seas-and-coasts/ecosystem-degradation-pollution/nutrient-management/gpnm

55. United Nations Environment Programme Finance Initiative (UNEP FI) (2020). 'Beyond 'Business as Usual': Biodiversity Targets and Finance Managing

biodiversity risks across business sectors'. Available at: https://www.unepfi.org/wordpress/wp-content/uploads/2020/06/Beyond-Business-As-Usual-Full-Report.pdf

56. United Nations Environment Programme Finance Initiative (UNEP FI) (2022). 'Exploring Natural Capital Opportunities, Risks and Exposure: A Practical Guide for Financial Institutions'. Available at: https://www.unepfi.org/publications/exploring-natural-capital-opportunities-risks-and-exposure-a-practical-guide-for-financial-institutions/
57. United Nations Environment Programme Finance Initiative (UNEP FI) (2023). 'The Portfolio Impact Analysis Tools for Banks (Version 3)'. Available at: https://www.unepfi.org/publications/the-portfolio-impact-analysis-tools-for-banks-version-3/
58. United Nations Environment Programme Finance Initiative (UNEP FI) (2025). 'Reduction and Management of Pollution in Agriculture'. Available at: https://www.unepfi.org/wordpress/wp-content/uploads/2025/06/Reduction-and-Management-of-Pollution-in-Agriculture.pdf
59. United Nations Institute for Training and Research (UNITAR) (n.d.). Basel, Rotterdam and Stockholm Conventions. Available at: https://unitar.org/sustainable-development-goals/planet/our-portfolio/basel-rotterdam-stockholm-conventions
60. United States Government Accountability Office (GAO) (2025). 'Persistent Chemicals: DOD Needs to Provide Congress More Information on Costs Associated with Addressing PFAS'. Report GAO-25-107401. Washington, D.C.: GAO. Available at: https://www.gao.gov/products/gao-25-107401
61. United States Environmental Protection Agency (US EPA) (2023). 'Lender Liability Under CERCLA'. Washington, D.C.: US EPA. Available at: https://www.epa.gov/system/files/documents/2023-01/Lender%20Liability%20with%20pub.pdf
62. United States Environmental Protection Agency (EPA) (n.d.). 'About the TSCA Chemical Substance Inventory'. Available at: https://www.epa.gov/tsca-inventory/about-tsca-chemical-substance-inventory#whatistheinventory
63. USEtox (n.d.). 'USEtox Model'. Available at: https://usetox.org/model
64. Wang, Z. et al. (2020). 'Toward a global understanding of chemical pollution: A first comprehensive analysis of national and regional chemical inventories'.

Environmental Science & Technology. Available at: https://doi.org/10.1021/acs.est.9b06379

65. Wolfram, J. et al. (2026). ‘Increasing applied pesticide toxicity trends counteract the global reduction target to safeguard biodiversity’. Science, 391(6785), pp. 616–621. Available at: https://doi.org/10.1126/science.aea8602

66. World Economic Forum (2020). ‘Nature Risk Rising: Why the Crisis Engulfing Nature Matters for Business and the Economy’. Available at: https://www.weforum.org/publications/nature-risk-rising-why-the-crisis-engulfing-nature-matters-for-business-and-the-economy

67. World Health Organization (WHO) (2020). ‘The WHO Recommended Classification of Pesticides by Hazard and Guidelines to Classification, 2019 Edition’. Available at: https://www.who.int/publications/i/item/9789240005662

68. World Health Organization (WHO) (2023). ‘Chemical safety factsheet’. Available at: https://www.who.int/europe/news-room/fact-sheets/item/chemical--safety

69. World Health Organization (WHO) (2025). ‘Environmental health’. Available at: https://www.who.int/health-topics/environmental-health#tab=tab_2

70. Wotton Kearney (2025). ‘PFAS Litigation: A Deep Dive into the Rise of Consumer-Led Claims and Its Implications’. Available at: https://www.wottonkearney.com/pfas-litigation-a-deep-dive-into-the-rise-of-consumer-led-claims-and-its-implications/